Ryukyu Scops Owl Ryukyu-konohazuku (Jpn) *Otus elegans*

Morphology and classification

Classification: Strigiformes Strigidae

The populations of Okinawa and Minami-daito(-jima) Islands will be primarily discussed in this paper.

Population of Okinawa Island

Total length:	about 20cm	Wing length:	162.0-177.0 mm
Tail length:	69.0-82.0mm	Culmen length:	18.8-24.0mm
Tarsus length:	29.2-33.5mm	Weight:	94.0-125.0g

Polpulation of Minami-daito Island

Total length:	about 18cm	
Wing length:	♂148.5-165.5mm	♀149.0-165.0mm
Tail length:	♂64.43-80.20mm	♀61.51-77.01mm
Culmen length:	♂18.31-22.90mm	♀19.47-22.51mm
Tarsus length:	♂28.13-31.74mm	♀28.05-31.77mm
Weight:	♂70.0-102.0g	♀78.0-111.5g

The measurements of Okinawa Island population are based on 17 males (Toyama pers. comm.). Measurements of Minami-daito Island population are based on 86 males and 54 females of one year and over from 2002 to 2009. Tail lengths exclude those of birds with worn out rectrices. Weights exclude those of females immdiately before egg-laying. The population of Minami-daito Island is remarkably smaller than those of the other regions (Severinghous et al. 2002).

Appearance:

Males and females are similar in plumage coloration. They are brown on the upperpart with an intricate pattern of black and yellowish brown flecks. The shoulder is vertically lined with white speckles. They are ashy brown on the underpart with brownish black vertical stripes and fine lateral bars. The facial disc is gray and fringed with reddish brown feathers. The bill is deep gray. The iris is yellow. They raise the reddish brown ear tufts when alerted. The toes are bare and gray.

Vocalization:

The well-known hoot of Ryukyu Scops Owls is a male territory call and males call "Kok, kohok" or "Kohok, kohok" repeatedly. They also utter various calls depending on individuals and situations. For instance, females call "Gyohok" in a thick voice or "Fnee, fniyaa" like a cat in response to males. Males rarely call like a cat as well. Both male and female hoot a single "Hoh--u" when they become tense. They threaten other birds or predators with "Shaa, shaa". They give out a sharp alarm call like "Kuok, kuok, kuok" when the nest is attacked. Females whisper "Pur-pur-pur" sweetly towards the male partner. Males shrill "Kyurrr" when copulating. This voice may also be uttered by females when they receive food from males during the courtship period, and excited nestlings when they are provided with food or when they fly to a branch. Nestlings beg for food in the nest, calling "Gyooi, gyooi" or "Jaj-ja" continuously.

Photo 1. A Ryukyu Scops Owl parent delivering a huntsman spider to the nestling in Minami-daito Island. [Masaoki Takagi]

Distribution and Habitat

Distribution:

Ryukyu Scops Owls are classified into the following four subspecies: *Otus elegans elegans* of the Nansei Islands, *O. e. interpositus* of the Daito islands, *O. e. botelensis* of Orchid Island off southeastern Taiwan and *O. e. calayensis* of the Batan Islands and the Babuyan Islands, the northernmost Philippines. Ryukyu Scops Owls were also confirmed to occur in Okinoshima Island, Fukuoka Prefecture, northern Kyushu in 2008. Currently, subspecies *O.e.interpositus* lives only in Minami-daito Island of the Daito Islands.

Habitat:

Ryukyu Scops Owls are originally a mature forest dweller, but nowadays they also live in a relatively open habitat, such as arable land (Photo 2). They generally breed in a tree cavity in the wood, but some of them nest in man-made structures. They use as a feeding ground a considerably open habitat, such as cropland, meadows and residential quarters, if perching places are available. In short, they are well adapted to artificially modified environments.

Photo 2. (left) Habitat of Okinawa Island (Forest of the Yambaru region). (right) Habitat of Minami-daito Island (Open cane fields with shelterbelts)

Life history

Breeding system:

Ryukyu Scops Owls are monogamous and breed once a year. They do not attempt to breed again if they have failed in the first breeding. Both males and females sexually mature at the age of one, but few birds can breed at this age in the habitat where unoccupied breeding territories are in short supply. When males acquire a territory, they try to attract females to form a pair. Pairs stay in the territory almost throughout the year. Although they maintain their pair-bond over the years, it is not uncommon for them to divorce. In Minami-daito Island, for instance, extra-pair fertilization is confirmed in about 15% of the nests.

Nest:

Ryukyu Scops Owls breed in a tree cavity. In the Yambaru region of Okinawa Island, they generally use the old nest holes which Okinawa Woodpeckers excavated in oaks (*Castanopsis sieboldii* and *Quercus stenophylla*). The average nest size is 6.5cm at the entrance, 15 by 15cm at the base and 30cm in depth (Toyama 2010). In farmland, on the other hand, they nest in the cavity of *Casuarina* often used as a shelterbelt. More than 90% of the nest trees are also *Casuarina* in Minami-daito Island where farmland predominates. The nesting *Casuarina* was 57cm in diameter at breast height on average, with a range of 27-88cm. The mean cavity size was 11.6cm by 39.8cm (with a range of 6-24cm by 10-125cm) at the entrance and 52.4cm (with a range of 14-162cm) in depth (n = 30). A small number of Ryukyu Scops Owls also use the cylindrical pit of *Livistona chinensis* snag with a broken upper part

Clutch and egg sizes and egg color

The clutch size is 1-4 eggs. Both in Okinawa and Minami-daito Islands, more than 50% is three eggs and about 30% two eggs. The clutch of one or four eggs is rare. Eggs are laid at 1-2 day intervals. The egg is white with no flecks and 33mm by 27mm in size (measured in Minami-daito Island).

Incubation and nestling periods and fledging rate

Ryukyu Scops Owls start to lay eggs in late April in Okinawa

♪ http://www.bird-research.jp/1_shiryo/koe/ryuukyuukonohazuku_060312_okinawa_kaji.mp3
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Island (Toyama 2010) and in late March in Minami-daito Island. Females alone incubate eggs. The incubation and nestling periods are about 26 and 30 days, respectively. Females incubate nestlings for about 10 days after hatching, while males exclusively feed them. After that, males and females feed nestlings. Young are provided with food by the parent birds in the natal territory for 20-40 days after fledging. The fledging rate is 74% in Okinawa Island (n = 141) (Toyama 2010) and 79% in Minami-daito Island (n = 100). The predation of snakes is primarily responsible for the breeding failure in Okinawa Island, whereas the breeding failure is attributed to the predation of introduced black rats, weasels and feral cats in Minami-daito Island.

Roost:

In Minami-daito Island, Ryukyu Scops Owls usually roost in the woods of *Livistona* during the daytime. When perched at the stem base of *Livistona*, it is not easy to find them because they blend in with brown fibers peculiar to palms. In addition, when an enemy approaches, they make themselves slender and raise their ear-tufts to mimic the stem of a palm tree, which doubles the camouflage effect (Photo. 3).

Photo 3. A Ryukyu Scops Owl mimicking the stem of a palm tree in Minami-daito Island. [Asuka Horie]

Diet and foraging behavior

Ryukyu Scops Owls are insectivorous. In Okinawa Islands, the diet of nestlings consists primarily of orthoptera (80%), such as *Prosopogryllacris* and *Gampsocleis*, followed by stick insects and house lizards (Toyama 2010). In Minami-daito Island, on the other hand, huntsman spiders and *Periplaneta americana* each comprise 25% of their diet, followed by orthoptera, house lizards and lepidoptera. They usually swoop down on their prey on the ground or on a tree from their perches. They occasionally fly-catch flying insects as well. In Minami-daito Island, they prefer the dense woods of *Ficus retusa* as a foraging site. They also capture their prey in the fields of crop and meadows from the edge of a wood.

Topics of ecology, behavior and conservation

Difference in vocalization between subspecies

The vocalization of Ryukyu Scops Owls varies between regions. I recorded the calls of 718 males in Orchid Island of Taiwan and 22 islands of the Nansei Islands (the southernmost island group of Japan) to analyze them using a sound spectrogram. The analysis showed that the calls were divided into two distinct groups by the Kerama Strait between Okinawa and Miyako Islands. In addition, the population of Minami-daito Island formed another vocalization group independently of these two groups. It is assumed, therefore, that Ryukyu Scops Owls are classified into the following three groups in terms of vocalization: birds north of Okinawa Island, those west of Miyakojima Island and those of Minami-daito Island.

Dispersal of young birds in a territory saturated habitat

It is extremely difficult for young Ryukyu Scops Owls to secure their territory in Minami-daito Island because the suitable habitat is limited to shelterbelts remaining in a narrow band and there is no space left to establish a new territory. The telemetry study of 38 fledglings showed that 16 birds survived until the next spring, seven of which could not find anywhere to settle in and became floaters. The males which fledged earlier acquired a territory closer to their natal site, but later fledglings dispersed further to establish their territory. Once male fledglings left their parents' territory, they promptly settled in a vacant territory whenever they found one. It is their strategy to acquire a territory on a first-come, first-served basis.

Should all introduced species be exterminated?

Photo 4. A female perched at the entrance of the nest hole (the cavity of *Casuarina*) in Minami-daito Island. [Yuzo Nakagawa]

The environment of Minami-daito Island has been modified so greatly and so many species have been introduced that little of the original environment remains in the island. As a result, four endemic subspecies of birds became extinct, but Ryukyu Scops Owls have survived. It is *Casuarina* introduced to the island that played a key role in conserving the population of Ryukyu Scops Owls. Since *Casuarina* grows quickly, it was planted for hardening the soil of a marsh and as a shelterbelt after deforestation. In addition, *Casuarina* tends to form a cavity in it. Research showed that introduced *Casuarina* had 15 times as many cavities as native *Livistona*, which Ryukyu Scops Owls principally used as a nest tree before deforestation. As mentioned above, therefore, they mostly nest in the cavities of *Casuarina* now (Photo. 4). In Minami-daito Island where woodlands have markedly declined, this introduced tree has provided Ryukyu Scops Owls with their nest sites. In some areas of Japan, efforts have been made to restore modified environments to the original state, but as in Ryukyu Scops Owls, some native species have already adapted and depended on modified environments. Therefore, the restoration of environments or the control of introduced species should be performed with due consideration.

Literature

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Author

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I enrolled in the lab of Department of Biology and Geosciences, Osaka City University in 2000. I carried out a study on Ryukyu Scops Owls in Minami-daito Island for eight years from 2002. I really learned a lot from the people and wildlife of the island. I am now learning graphic design and illustration to convey the charm of wildlife to wide range of people.

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